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Coastal CoP – May 2006
Great Lakes Navigation System (GLNS) Reliability

Achieving Acceptable Levels of Risk

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CURRENT CONDITION PRACTICE:

- **Operations & Maintenance (O&M) individually accomplished by the three Great Lakes Districts (Buffalo, Chicago & Detroit).**
- **Program priorities set by historic requirement, informal stakeholder involvement, and condition assessment; but differs by district**

DESIRED FUTURE CONDITION PRACTICE:

- **Focused program of priorities which engages stakeholders and concentrates on highest priority projects in terms of reducing risk and providing optimal reliability.**
- **Based on metrics that reflect local, regional and binational significance.**
- **Consistent condition assessment methodology applied throughout region**

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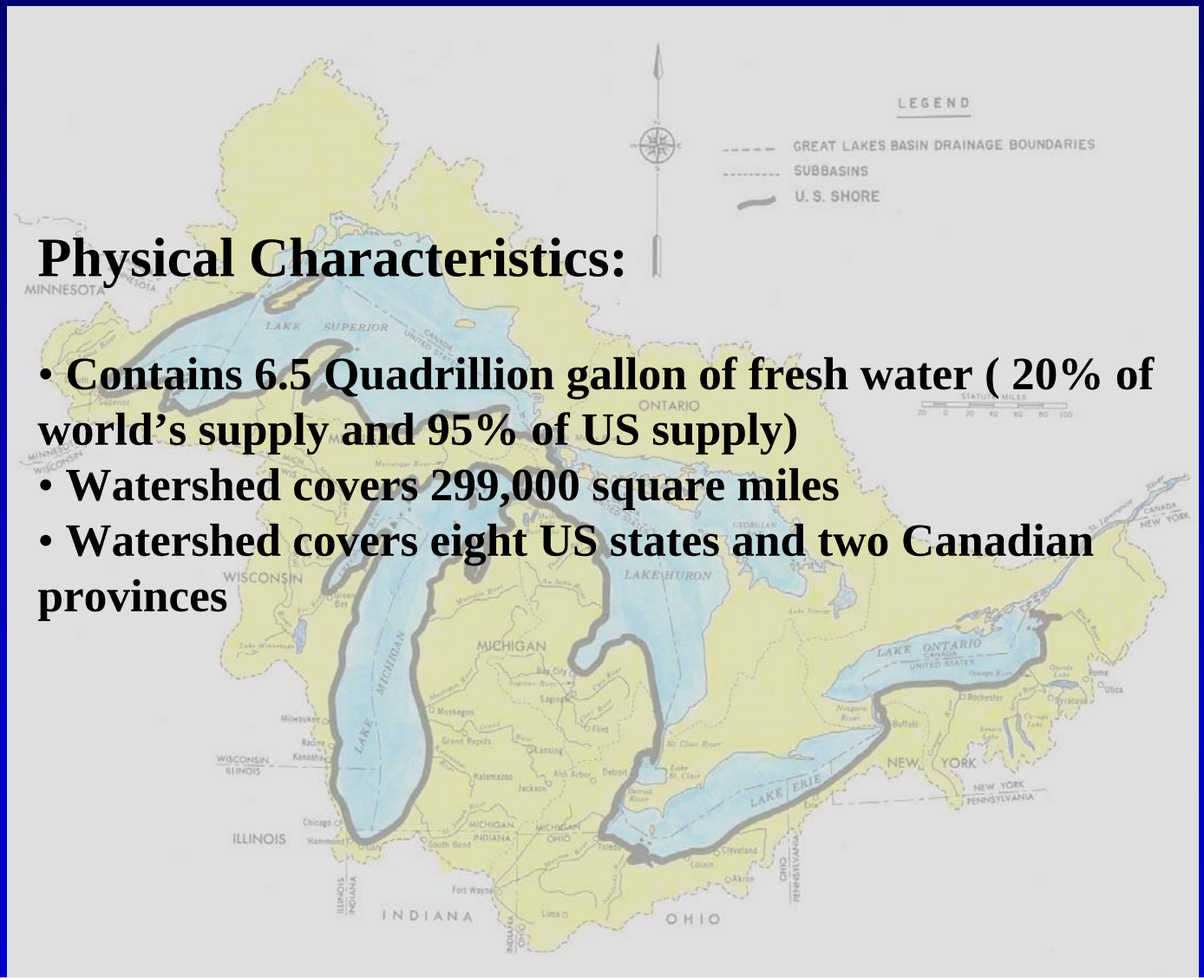

Physical Characteristics:

- **Contains 6.5 Quadrillion gallon of fresh water (20% of world's supply and 95% of US supply)**
- **Watershed covers 299,000 square miles**
- **Watershed covers eight US states and two Canadian provinces**

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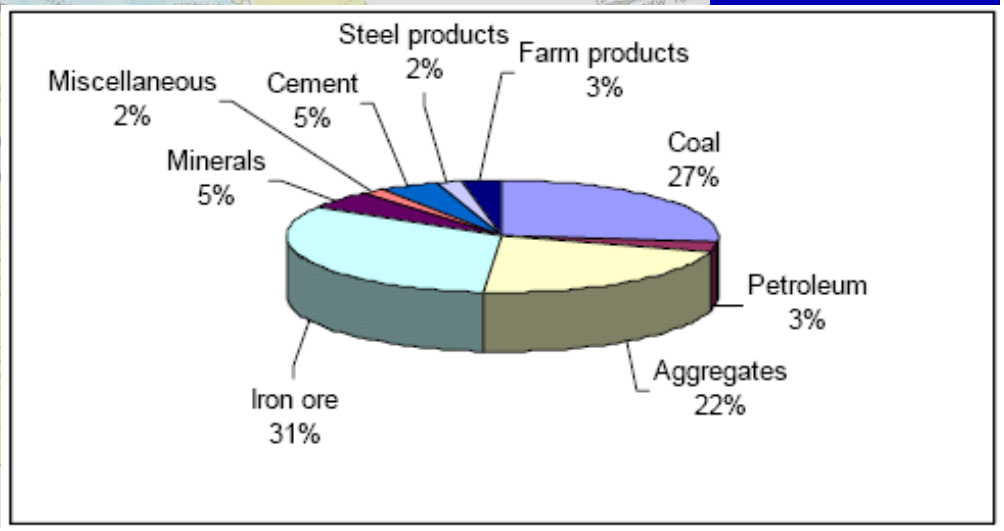
Economic statistics:

- **Over 150 million tons of commodities shipped annually**
- **Two general trade communities: traffic moved on Seaway (import/export) & inter-lake**
- **Multi-modal system. Major rail and highway hubs – Chicago, Toronto, Detroit & Toledo – are also GLNS ports.**



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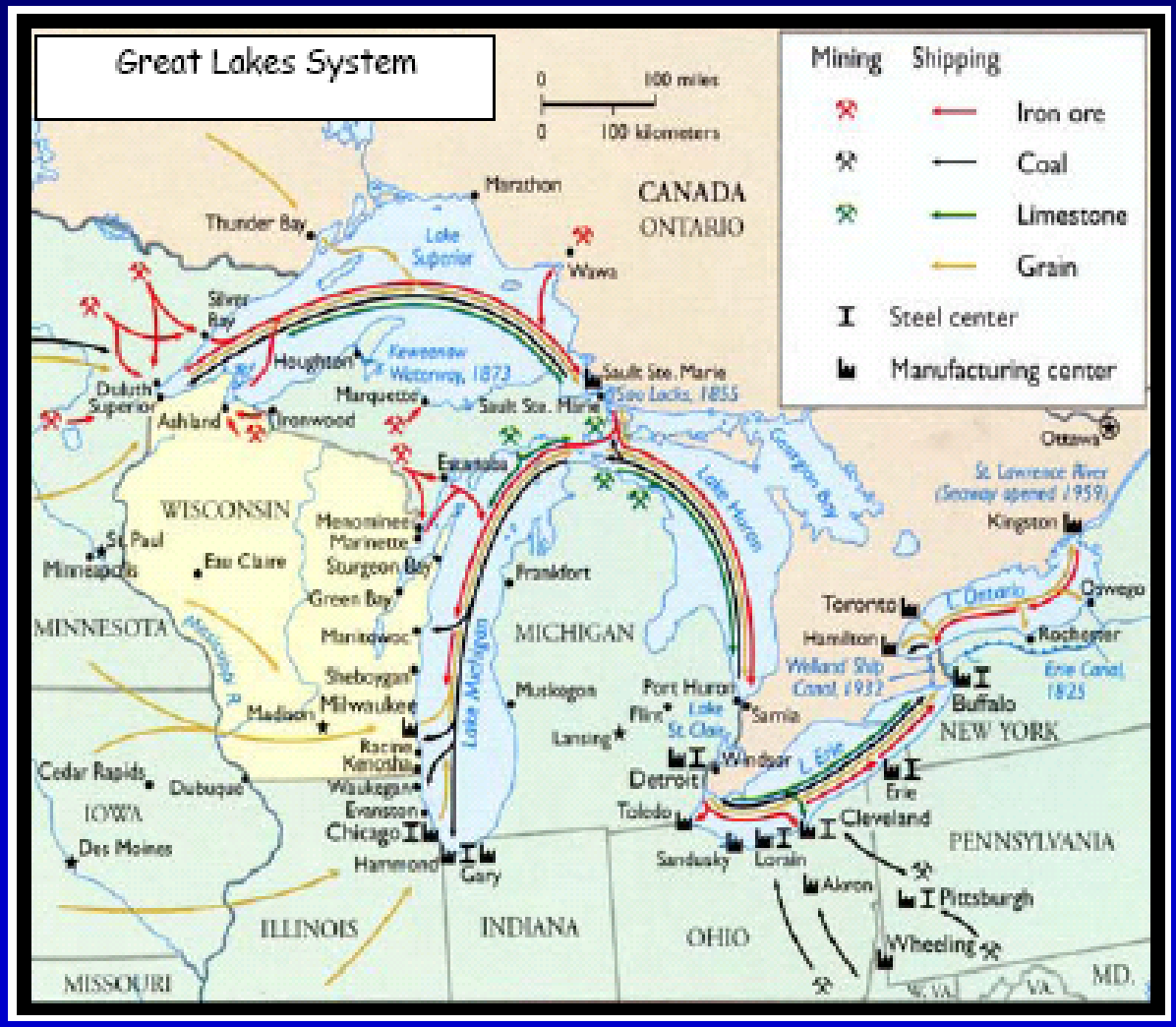

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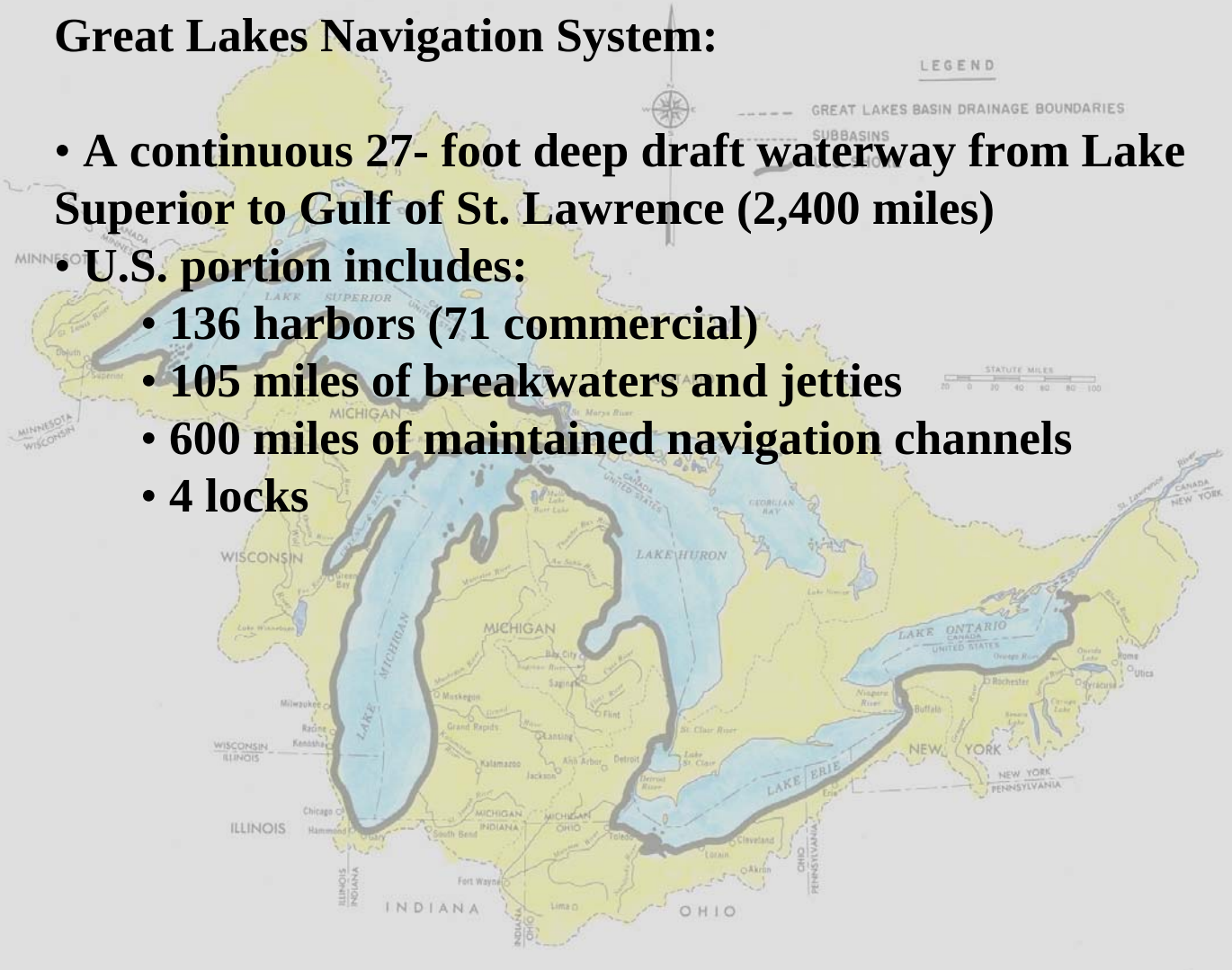
Great Lakes Navigation System:

- **A continuous 27- foot deep draft waterway from Lake Superior to Gulf of St. Lawrence (2,400 miles)**
- **U.S. portion includes:**
  - **136 harbors (71 commercial)**
  - **105 miles of breakwaters and jetties**
  - **600 miles of maintained navigation channels**
  - **4 locks**



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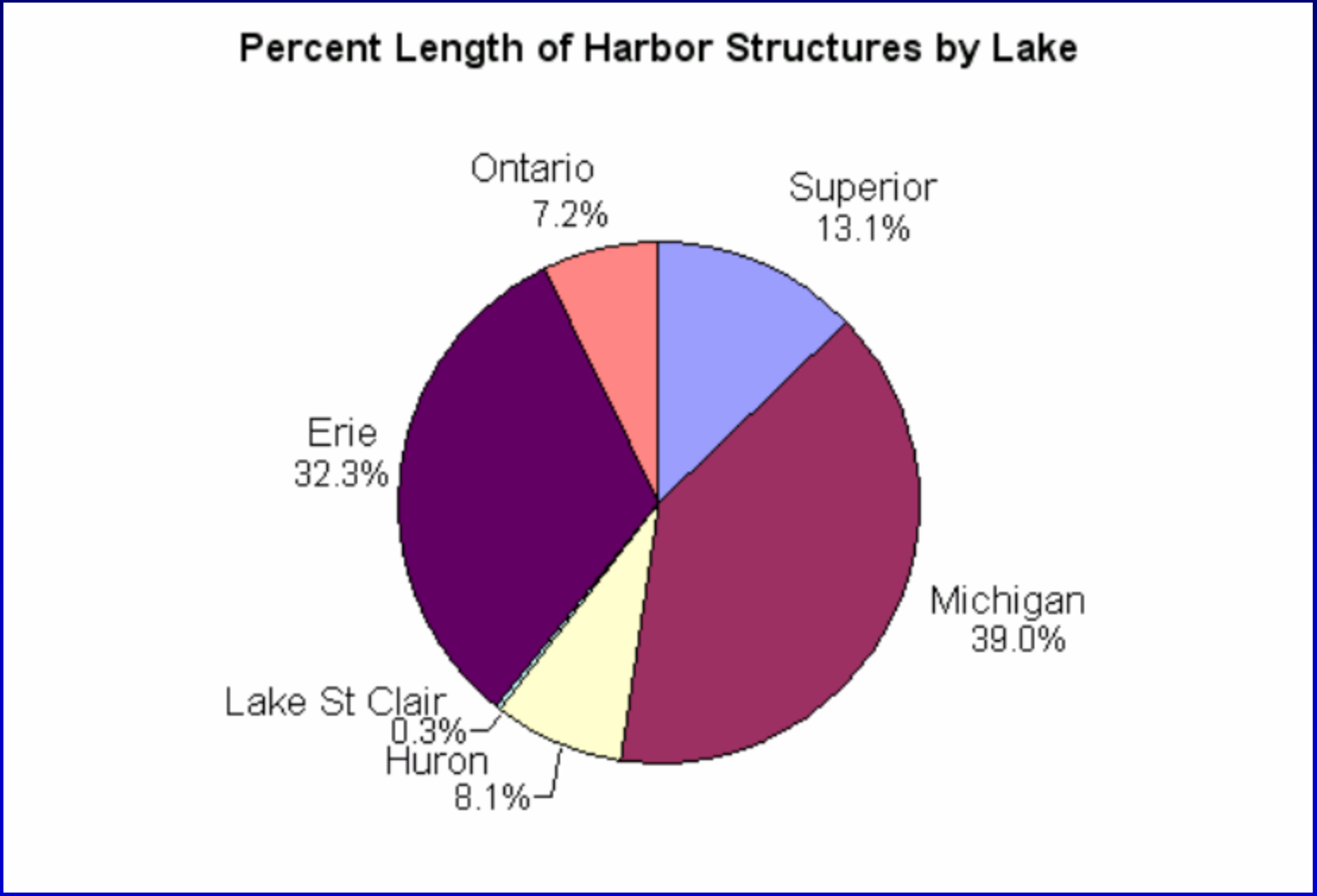

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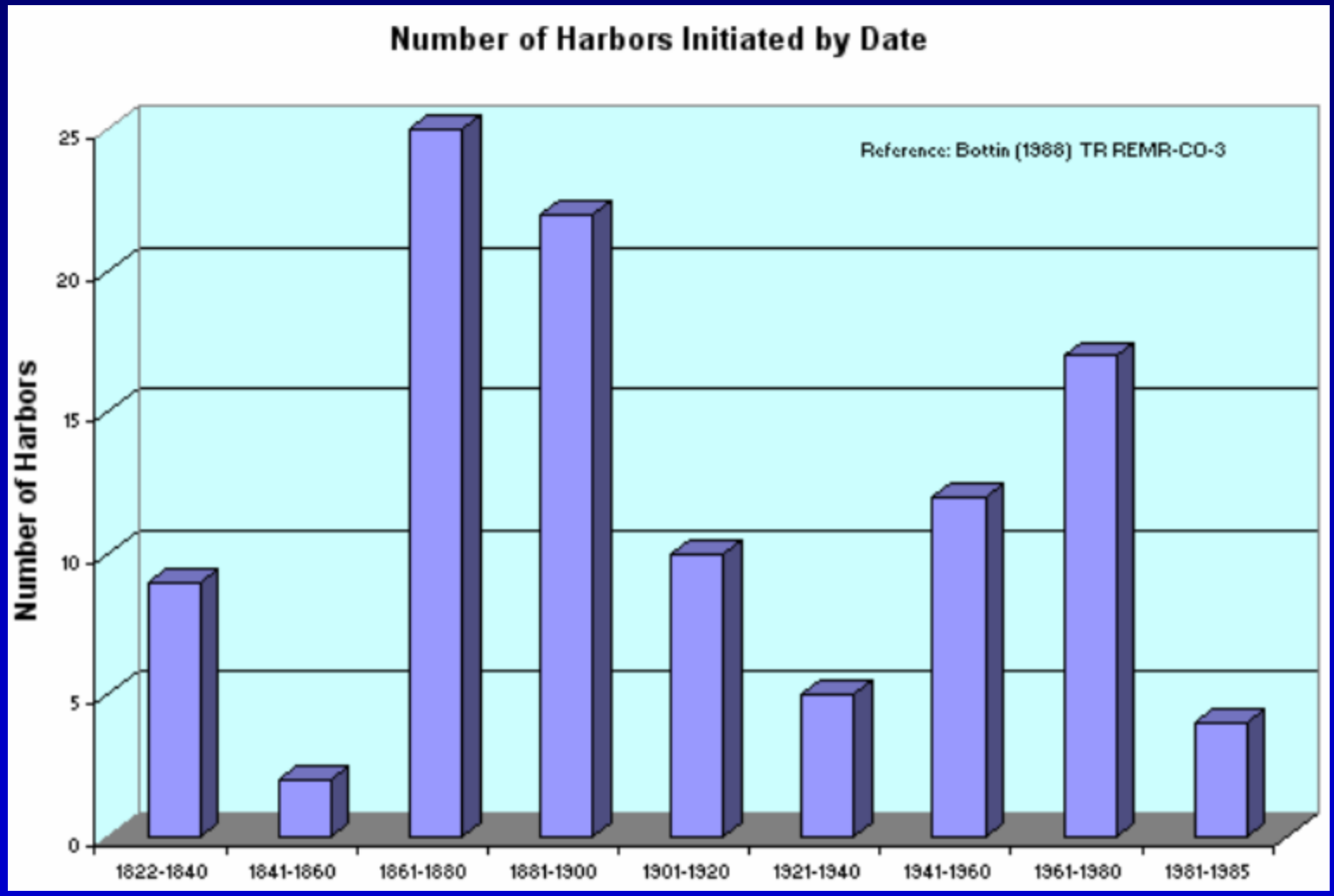

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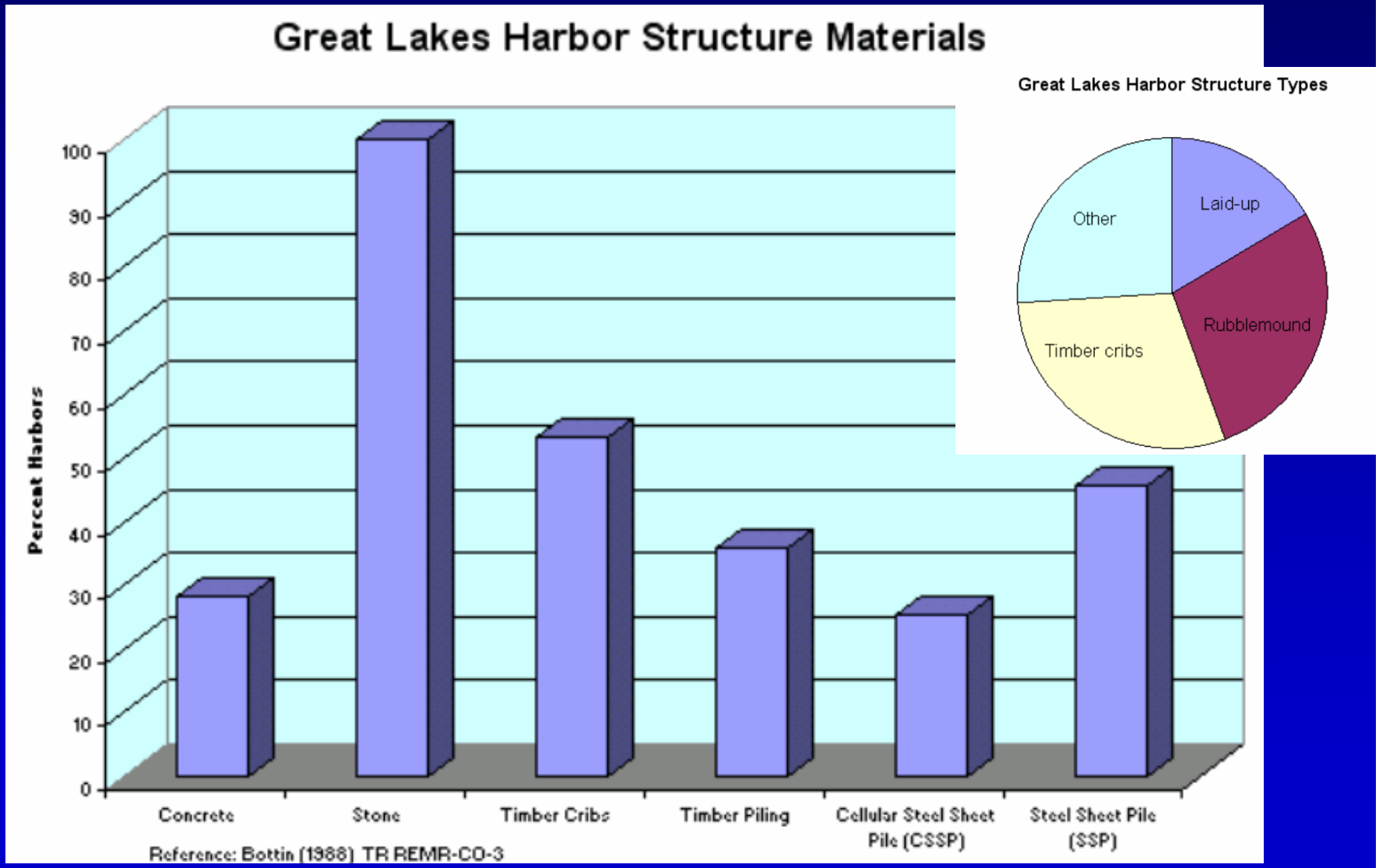

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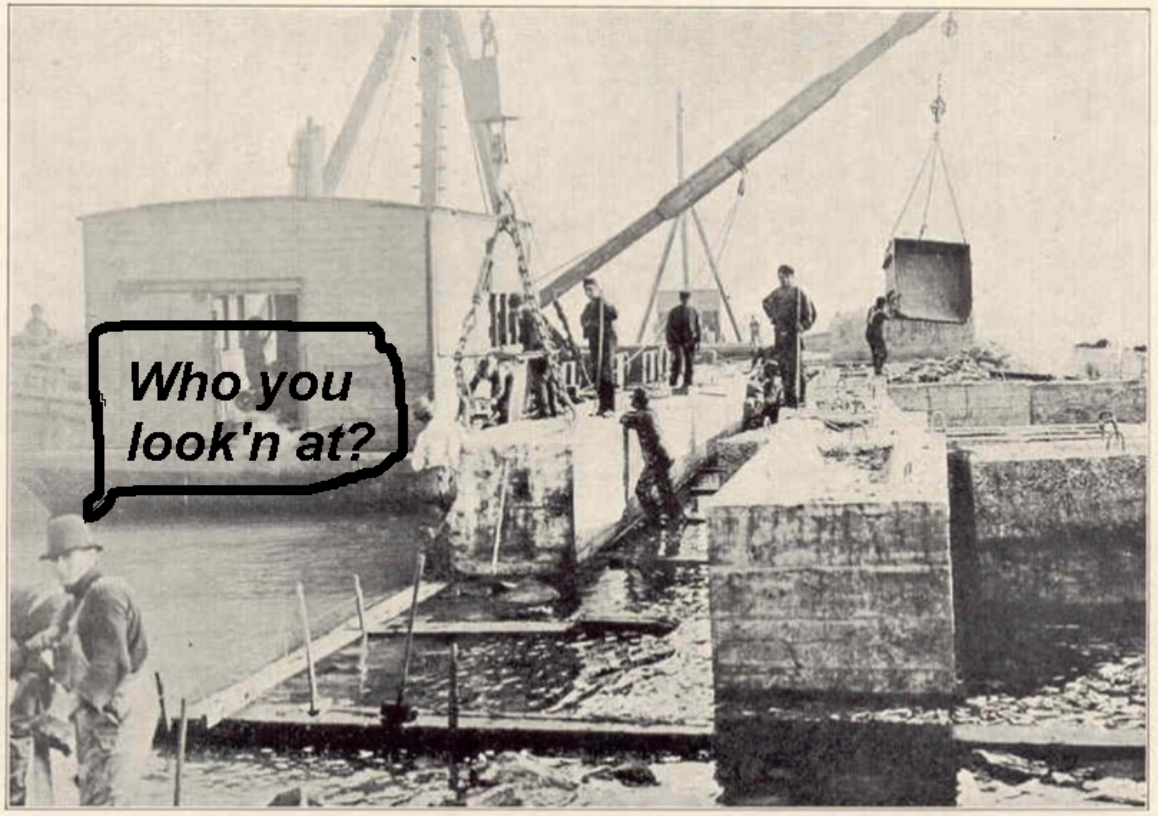
CONSTRUCTION TYPES AND MATERIALS



Buffalo Harbor, NY - Setting Concrete Blocks on Harbor Side 1901

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CONCRETE


Chicago Harbor


Sturgeon Point


Sturgeon Point

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STONE


Cleveland E BKW - 1899


Cattaraugus


Buffalo Harbor

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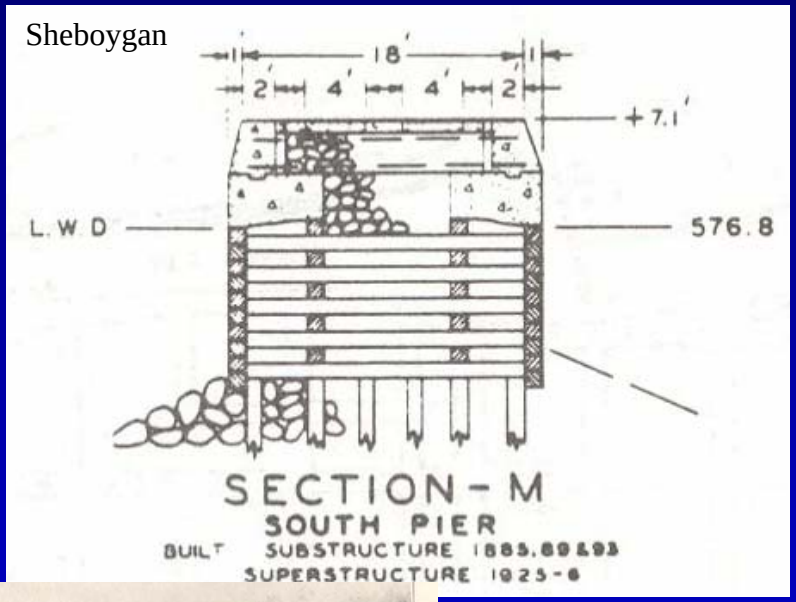
TIMBER

Cleveland E Pier - 1896

Sheboygan



Cleveland 1904

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CELLULAR SHEET PILE

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STEEL SHEET PILE

Little Sodus East Pier

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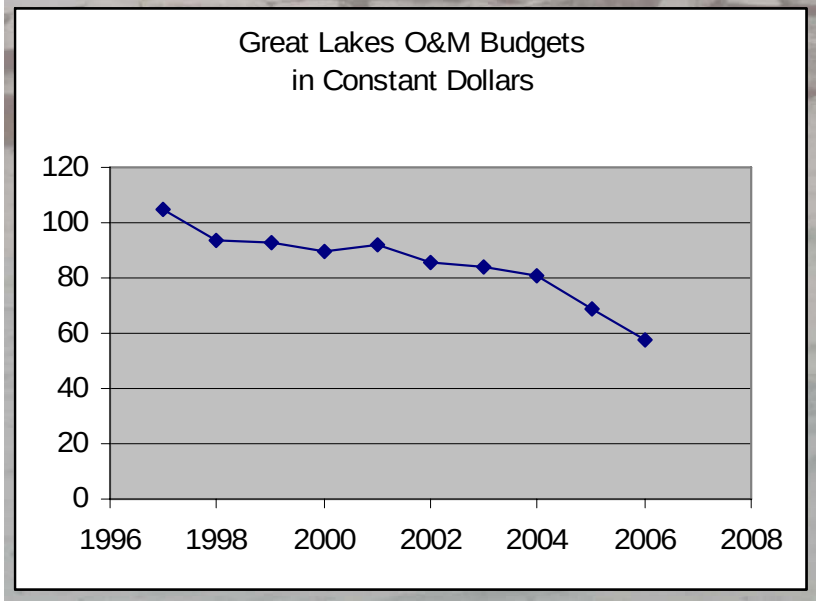
HARBOR CONDITION



- **Total O&M Dollars for 2007 are at 57% (real dollars) of the 1997 amount**
- **In order to maintain channels, more structure maintenance is curtailed.**

Chicago Harbor June 2002

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STRUCTURE CONDITION

Cleveland East Breakwater - 10 April 2002
Movie Clip

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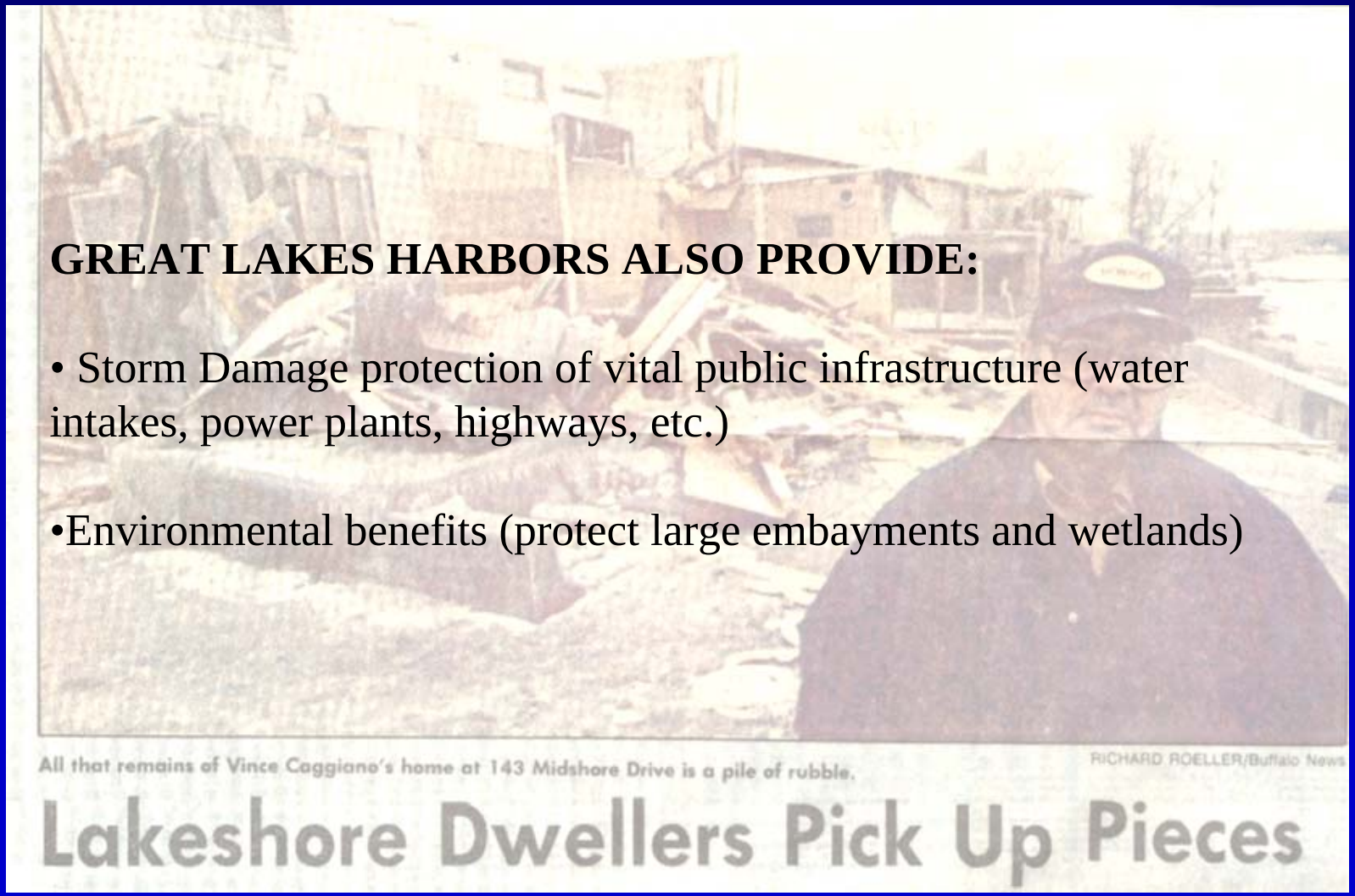
GREAT LAKES HARBORS ALSO PROVIDE:

• Storm Damage protection of vital public infrastructure (water intakes, power plants, highways, etc.)

•Environmental benefits (protect large embayments and wetlands)



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THE WAY AHEAD:

1. **What are the suggested first steps in developing a regional inspection and engineering evaluation program?**
2. **What metrics are suggested for prioritizing required repairs in a constrained monetary environment?**

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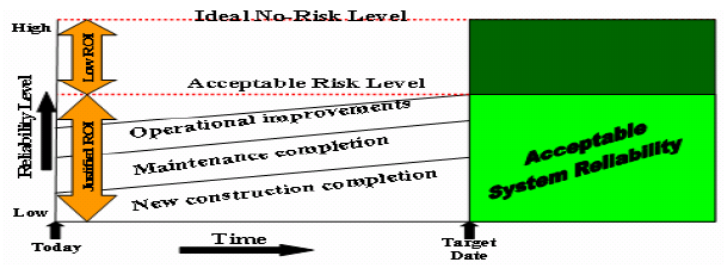
Draft Navigation FYDP Risk Level Methodology for Great Lakes Commercial Navigation Projects

Risk Level Methodology for Great Lakes Commercial Navigation Projects



	Acceptable Risk Level
A	Virtually no compromise to authorized Federal project features accepted.
B	Minimal compromise to authorized Federal project features accepted.
C	Moderate compromise to authorized Federal project features accepted.
D	Substantial compromise to authorized Federal project features accepted.
E	Significant compromise to authorized Federal project features accepted.

DISTRICT	PROJECT NAME	Acceptable Risk Level	Current Risk Level
LRB	ANYPLACE HARBOR, OH	B	C
LRB	THAT CHANNEL AND HARBOR, NY	D	E
LRB	THIS HARBOR, NY	C	D
LRB	LAKE HARBOR, PA	C	C
LRB	SOMEBURG, NY	D	D
LRB	PROJECT CONDITIONS SURVEYS, NY	A	B
LRB	HARBOR, NY	D	D
LRB	WHAT HARBOR, OH	B	D
LRC	BURNS HARBOR, IN	B	B
LRE	CHANNELS, MI	A	C
LRE	CHANNELS	A	A
LRE	LITTLE USED WATERWAY, MI	E	C

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Harbor Evaluation Guidance for determining Current Risk Level :

•Harbors consist of the following elements:

1. CDF (Rating to be based upon physical condition and remaining capacity)
2. Federal Channel area (Rating to be based upon loss of channel cross-section and depth of shoaling)
3. Protective Structures (includes breakwaters, jetties, and piers) – Rating based upon physical condition

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The following harbor element weighting factors are recommended for

Harbors that include a CDF:

1. CDF operation and maintenance – 30%
2. Federal Channel maintenance - 40%
3. Breakwater maintenance – 30%

Harbors without a CDF would use the following weighting factors:

1. Federal Channel maintenance – 60%
2. Breakwater maintenance – 40%

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The individual harbors must be ranked also according to a system significance metric.

- Accounts for tonnage
- Relevance of port to controlling commodity movement to other ports in system

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SUMMARY:

- Many Great Lakes harbor structures are over a century old.
- Harbor structures composed of timber cribs, cut stone, steel sheet pile and rubble mound.
- Declining maintenance dollars requires regional approach
- Need for consistent condition assessment methodology applied through region
- Focused maintenance program which engages stakeholders and metrics that reflect local, regional and binational significance

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What can Coastal CoP do to help?

Get MSC and HQ to advocate R&D money for development of

1. Inspection/evaluation/prioritization program that is
   - regional
   - cost efficient
   - fits in with O&M time requirements (relatively quick)
   - easy to use
2. Limit state equations of non-rubblemound coastal structures for inclusion in life-cycle analysis

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